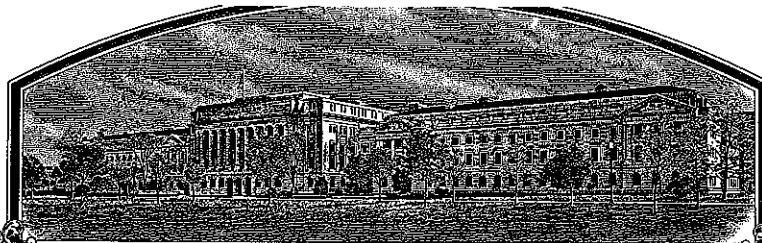


No.

200600297



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

The Regents of the University of California

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE FOREGOING PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMERICAL GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT, COMMON

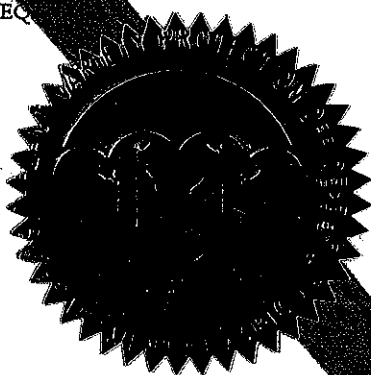
'Patwin'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this ninth day of April, in the year two thousand and seven.

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture



U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

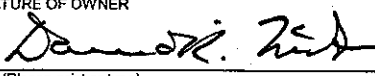
1. NAME OF OWNER The Regents of the University of California		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME UC1419	3. VARIETY NAME 'Patwin'
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) University of California 1111 Franklin Street, 12th Floor Oakland, California 94607-5200		5. TELEPHONE (Include area code) (510) 587-6000	FOR OFFICIAL USE ONLY PVPO NUMBER 200600297 FILING DATE Sept. 18, 2006
		6. FAX (Include area code) (510) 587-6090	
7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) Corporation	8. IF INCORPORATED, GIVE STATE OF INCORPORATION CA	9. DATE OF INCORPORATION January 1, 1868	
10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. (First person listed will receive all papers) Michael R. Ward Morrison & Foerster LLP 425 Market Street San Francisco, Ca 94105			FILING AND EXAMINATION FEES: \$ 3652 \$ 930.00 DATE 9/18/06 9/25/06 CERTIFICATION FEE: \$ 768.00 DATE 3/22/2007

11. TELEPHONE (Include area code) (415) 268-6237	12. FAX (Include area code) (415) 268-7522	13. E-MAIL MWard@mofo.com
14. CROP KIND (Common Name) Wheat	16. FAMILY NAME (Botanical) Poaceae	18. DOES THE VARIETY CONTAIN ANY TRANSGENES? (OPTIONAL) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF SO, PLEASE GIVE THE ASSIGNED USDA-APHIS REFERENCE NUMBER FOR THE APPROVED PETITION TO DEREGULATE THE GENETICALLY MODIFIED PLANT FOR COMMERCIALIZATION.
15. GENUS AND SPECIES NAME OF CROP Triticum aestivum	17. IS THE VARIETY A FIRST GENERATION HYBRID? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
19. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse) a. <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety b. <input checked="" type="checkbox"/> Exhibit B. Statement of Distinctness c. <input checked="" type="checkbox"/> Exhibit C. Objective Description of Variety d. <input checked="" type="checkbox"/> Exhibit D. Additional Description of the Variety (Optional) e. <input checked="" type="checkbox"/> Exhibit E. Statement of the Basis of the Owner's Ownership f. <input checked="" type="checkbox"/> Voucher Sample (2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository) g. <input checked="" type="checkbox"/> Filing and Examination Fee (\$3,652), made payable to "Treasurer of the United States" (Mail to the Plant Variety Protection Office)		20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act) <input checked="" type="checkbox"/> YES (If "yes", answer items 21 and 22 below) <input type="checkbox"/> NO (If "no", go to item 23) 21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, WHICH CLASSES? <input checked="" type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED 22. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS. <input checked="" type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED (If additional explanation is necessary, please use the space indicated on the reverse.)
23. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. (Please use space indicated on reverse.)		24. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (Please use space indicated on reverse.)

25. The owners declare that a viable sample of basic seed of the variety has been furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Owner(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF OWNER 		SIGNATURE OF OWNER	
NAME (Please print or type) David R. McGee		NAME (Please print or type)	
CAPACITY OR TITLE Executive Director Technology Transfer	DATE 9/1/06	CAPACITY OR TITLE	DATE

INSTRUCTIONS

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be received in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to reproduce the variety, or for tuber reproduced varieties verification that a viable (in the sense that it will reproduce an entire plant) tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for \$3,652 (\$432 filing fee and \$3,220 examination fee), payable to "Treasurer of the United States" (See Section 97.6 of the Regulations and Rules of Practice.) Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfilled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of \$432 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office

Telephone: (301) 504-5518

FAX: (301) 504-5291

Homepage: <http://www.ams.usda.gov/science/pvpo/pvpindex.htm>

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority and provide evidence that name has been cleared by the appropriate recognized authority before the Certificate of Protection is issued. For example, for agricultural and vegetable crops, contact: Seed Branch, AMS, USDA, 10301 Baltimore Avenue, Suite 401 NAL Building, Beltsville, MD 20705. Telephone: (301) 504-5682 <http://www.ams.usda.gov/lsg/seed.htm>.

ITEM

- 19a. Give:
- (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
 - (2) the details of subsequent stages of selection and multiplication;
 - (3) evidence of uniformity and stability; and
 - (4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified
- 19b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:
- (1) identify these varieties and state all differences objectively;
 - (2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
 - (3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.
- 19c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.
- 19d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.
- 19e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.
20. If "Yes" is specified (*seed of this variety be sold by variety name only, as a class of certified seed*), the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. (See Regulations and Rules of Practice, Section 97.103).
23. See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.
24. See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.

22. CONTINUED FROM FRONT (Please provide a statement as to the limitation and sequence of generations that may be certified.)

Please see attached addendum.

23. CONTINUED FROM FRONT (Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)

24. CONTINUED FROM FRONT (Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. The fees for filing a change of address; owner's representative; ownership or assignment; or any modification of owner's name is specified in Section 97.175 of the regulations. (See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 1.4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, sexual orientation, marital or family status, political beliefs, parental status, or protected genetic information. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

200600297

ADDENDUM TO ST-470: Item No. 22.

Foundation seed will not be limited to the number of generations. Foundation seed will be maintained solely by the University of California Foundation Seed Program. Registered seed will only be produced from Foundation seed.

3

Docket No. 51411-29015.00
"Patwin"

“Patwin”

Exhibit A . Origin and breeding history of the variety

1. Parentage

Patwin “UC1419” is a Hard White Spring derived from the cross **Madsen/2*Express**. Madsen (PI 511673) is a Soft White Winter wheat (SWW) developed in Washington, United States and jointly released by the USDA-ARS and the Agric. Exp. Stations of Washington, Idaho, and Oregon (Allan et al. 1989). Express is a Hard Red Spring (HRS) variety released by Western Plant Breeders (now WestBred, LLC). Both Madsen and Express have been used commercially for several years and are widely available.

2. Breeding History

2. A. Stages of election and multiplication

The original cross was made by J. Dubcovsky in experiment JD960018 and backcrossed to ‘Express’ in experiment 976043. In 1998 it was assigned the official hybrid ID CA980086. The BC₁ plants carrying the *Lr37/Yr17/Sr38* rust resistance complex were selected with molecular markers (Helguera et al. 2003) and then self pollinated and advanced to BC₁F₅.

BC₁F₂ seed was produced in experiment 98609/17-18 and used to plant experiment 98615/41-50. BC₁F₃ was planted in experiment 99051/444 and BC₁F₄ in experiment 00052/12. Patwin was first evaluated for yield as BC₁F₅ 01039/562 in a small plot single replication experiment and was harvested in bulk. Based on its excellent performance was advanced directly to Elite trials where was tested in 2002 (BC₁F₆, 02013/13) and 2003 (BC₁F₇, 03010/24) in three locations.

Half-seeds from five heads from 03010/24 were tested for high molecular weight glutenins and homozygous lines for the *Glu-D1* 5+10 allele were selected. The selected homozygous grains were planted in the greenhouse to produce BC₁F₈ seed. The BC₁F₈ seed was used to plant 18 large plots in experiment 04026/36 in the field (BC₁F₉). From these plots we harvested 1000 heads that were planted as headrows in experiment 05116/1 at Tulelake (BC₁F₁₀). We harvested 400 pounds of Breeders Seed and delivered it to the FSP in 2005 for production of Foundation Seed in 2006. In 2004 and 2005 it was tested in Regional Trials as UC1419 in eight locations under irrigation and was part of the Collaborators Quality Evaluation. In 2005 it was also grown as strip trials by Kent Brittan at four locations.

2. B. Selection criteria

The plants were selected based on observation of the plants in the field, and objective yield and laboratory data. Elite yield trials were performed at three locations and Regional Trials were performed at 10 locations during 2004 and 2005. Quality data was obtained from the California Wheat Commission Quality Laboratory for one location each year. The following criteria were used:

1. Early flowering
2. Low stature and good agronomic appearance
3. High yield potential
4. Resistance to lodging
5. White grains
6. Hard grain texture
7. High protein content
8. Strong gluten and good breadmaking quality
9. High Molecular weight subunits 5+10 (*Glu-D1*)
10. Resistance to stripe rust, leaf rust and septoria tritici blotch
11. Presence of a 2NS/2AS translocation from *T. ventricosum* carrying leaf rust resistance gene *Lr37*, stripe rust resistance gene *Yr17*, and stem rust resistance gene *Sr38*.

2. C. Characteristics by which the application variety can be distinguished from the direct parents

Differences from Madsen

Patwin is a spring variety (*Vrn-D1* allele) whereas Madsen is a winter variety (*vrn-D1* allele) that requires vernalization to flower.

Patwin has hard textured grains (deletion in Puroindoline A gene, allele *Pina-D1b*) whereas Madsen has soft textured grains (normal Puroindoline A gene, allele *Pina-D1a*)

Patwin has high molecular weight glutenin subunits 5+10 at the *Glu-D1* locus and Madsen has subunits 2+12

Differences from Express

Patwin has white grains whereas Express has red grains

2. D. Statement concerning whether the variety is uniform and stable and how many generations the variety has been observed to determine this.

- Variety Patwin is uniform for all traits as described in Exhibit C (Objective Description of Variety)
- Variety Patwin has been reproduced and judged stable for the last three generations.
- Variety Patwin was stable in all the Elite (3 locations) and Regional Trials (10 locations) during the 2004 and 2005 trials) and during the production of the Breeder's Seed in 2005 (Cal/West Seed test #05SERV-293: 99.9% pure seed) and Foundation Seed in 2006.

E) Statement concerning whether there are genetic variants that are to be expected during normal maintenance of the variety, the description of the variants, and their frequency

- Variety Patwin shows the following variant frequency: Plants 1 to 1.5 heads taller or shorter have been found with a frequency lower than one in 1000 plants. Red grains have been observed with a frequency lower than 1 in 1000. Depending on herbicide applications and environmental conditions, branched spikes can be observed with a frequency of less than 1 in 1000 plants.

References

Allan R.E., C.J. Peterson, G.L. Rubenthaler, R.F. Line, D.E. Roberts. 1989. Registration of Madsen wheat. *Crop Science* 29:1575.

Helguera M., I.A. Khan, J. Kolmer, D. Lijavetzky, L. Zhong-qi, J. Dubcovsky. 2003. PCR assays for the *Lr37-Yr17-Sr38* cluster of rust resistance genes and their use to develop isogenic hard red spring wheat lines. *Crop Science* 43:1839-1847

'Patwin'**Exhibit B: Statement of Distinctiveness**

Patwin "UC1419" is a Hard White Spring variety. **The most similar variety to Patwin is its spring parent Express.** Both varieties have similar height and heading dates and their leaves, glumes, stems and peduncles in mature plants show abundant wax on the surfaces.

However, the two varieties can be clearly differentiated by the following characteristics:

1. Patwin has white seeds whereas Express has red seeds.

Patwin is a hard white spring variety and can be easily differentiated from its hard red spring parent Express by the white color of the seeds.

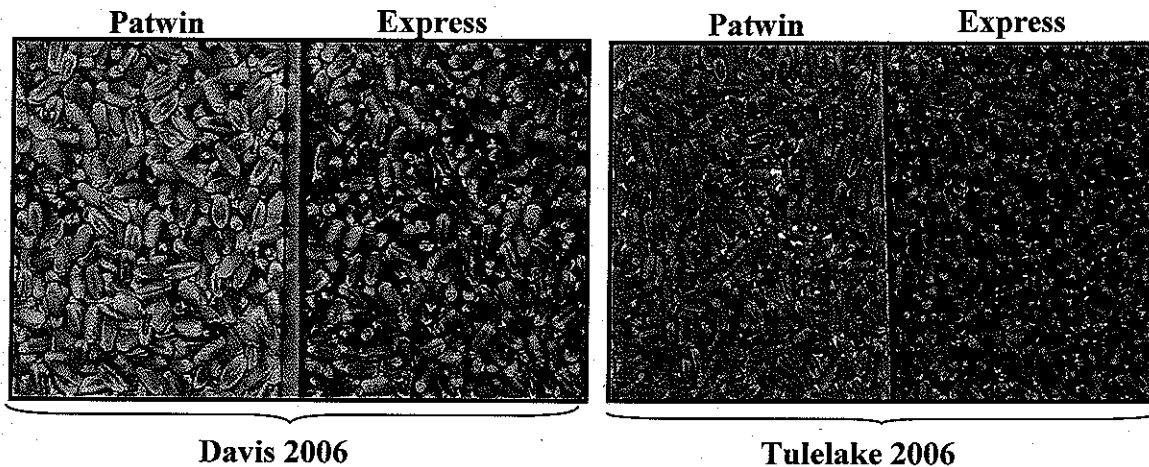


Fig. 1. Photographs of Patwin and Express seeds from plots grown side by side in Davis, CA (2006) and in Tulelake, CA (2006).

According to the "The Munsell Book of Color. Matte Collection" (Munsell ® Color Services, NY) Patwin seeds are more similar to Munsell hue **2.5Y**, value= 7, chroma= 2; whereas Express seeds are more similar to Munsell hue **7.5 YR**, value= 5, chroma= 4.

2. Patwin carries leaf rust resistance gene *Lr36*, stripe rust resistance gene *Yr17*, and stem rust resistance genes *Sr37*, which are all absent in Express.

These three genes are present in a segment of chromosome arm 2NS translocated to wheat chromosome arm 2AS, which is present in the winter parent Madsen. This 2NS segment does not recombine with the wheat chromosomes (Helguera et al. 2003) and is inherited as a single recombination block. Therefore, a single molecular marker is sufficient to demonstrate the presence of the complete segment. Figure 2, shows the presences of the characteristic PCR amplification products from the 2NS genome, which are absent from the Express samples using two independent pairs of primers published by Helguera et al. (2003).

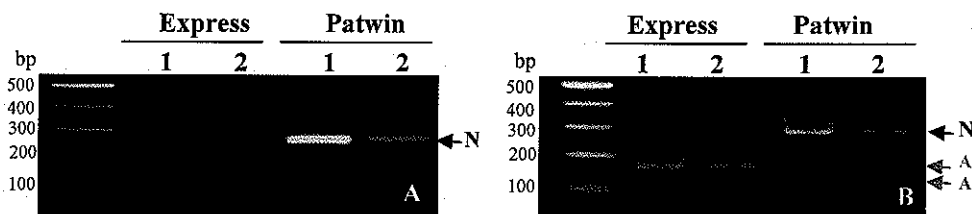


Fig.2. Genomic DNAs were extracted from two independent samples of Express and Patwin breeder seed. Letters “A” (in gray) and “N” (in black) indicate nbands amplified from the A genome allele from wheat and the N genome from *T. ventricosum*, respectively. **A)** PCR amplification with 2NS specific primers VENTRIUP and LN2 (Helguera et al. 2003). The black arrow indicates the 2NS specific 262-bp PCR amplification product. **B)** PCR fragments amplified with primers URIC – LN2 followed by *Dpn* II digestion (Helguera et al. 2003). The black arrow indicates the 2N genome PCR amplification product (285-bp). The gray arrows indicate *Dpn* II digested fragments (166 and 109 bp) from the A genome of wheat. The first line in both figures is the size molecular marker.

These markers were published in Crop Science in 2003 and are widely used in marker assisted selection programs.

Reference

“Helguera, M., I. A. Khan, J. Kolmer, D. Lijavetzky, L. Zhong-qi, J. Dubcovsky. 2003. PCR assays for the *Lr37-Yr17-Sr38* cluster of rust resistance genes and their use to develop isogenic hard red spring wheat lines. Crop Science. 43:1839-1847.”

3. Patwin has better resistance to stripe rust than Express. Patwin has at least one more stripe rust resistance gene than Express, as indicated by the presence of the 2NS translocation carrying the stripe rust resistance gene *Yr17*. This is reflected in higher levels of stripe rust resistance in the field.

The original data for the final percent infection of the penultimate leaf (flag-1 leaf) measured at the soft-to medium dough stage of growth is presented in Table 1 of Exhibit D. Exhibit D includes additional information for the different locations used in this study. The summary statistics from the ANOVAs are included below.

The percent final infection of the penultimate leaf was higher in Express than in Patwin in the nine locations analyzed. The differences were statistically significant in six of the nine locations confirming that Patwin has a better field resistance to stripe rust than Express.

No significant differences were detected by Levene’s tests indicating valid levels of homogeneity of variances. Normality of the residuals was not rejected for any of the analysis by the Shapiro-Wilk test. These results indicate that the results from the ANOVA are valid.

Table 1. Stripe rust. Statistical analyses of percent final infection of the penultimate leaf (flag-1 leaf) measured at the soft-to medium dough stage of growth. Data was analyzed by ANOVA as a Randomized Complete Block Design with four replications. The raw data is in Exhibit D Table 1.

Location:	Davis		Davis		Davis	
Day planted:	11/12/2003		11/19/2004		11/16/05	
Day measured:	4/22/2004		5/10/2005		5/24/2006	
Variety	Express	Patwin	Express	Patwin	Express	Patwin
Mean	42 %	5 %	28 %	1 %	98 %	4 %
SE of the mean	8.5	3.1	8.7	0.7	0.9	2.4
P ANOVA	0.04		0.06		<0.0001	
F ANOVA	11.6		8.5		2751.0	
Levene	0.16		0.16		0.11	
Shapiro-Wilk	0.99		0.98		0.99	

Location:	Delta		Delta		Delta	
Day planted:	11/17/2003		11/23/2004		12/5/05	
Day measured:	4/23/2004		4/18/2005		5/26/2006	
Variety	Express	Patwin	Express	Patwin	Express	Patwin
Mean	50 %	1 %	16 %	1 %	31 %	2 %
SE of the mean	7.1	0.8	8.3	0.8	10.1	0.9
P ANOVA	0.005		0.15		0.06	
F ANOVA	53.2		3.6		8.7	
Levene	0.14		0.17		0.13	
Shapiro-Wilk	0.99		1.00		0.87	

Location:	Colusa		Madera		Kern	
Day planted:	11/14/05		11/28/05		12/9/05	
Day measured:	5/2/2006		4/27/2006		5/17/2006	
Variety	Express	Patwin	Express	Patwin	Express	Patwin
Mean	91 %	0 %	35 %	2 %	60 %	4 %
SE of the mean	7.2	0.3	6.5	0.9	12.9	2.3
P ANOVA	0.001		0.01		0.03	
F ANOVA	162.4		26.5		14.6	
Levene	0.17		0.08		0.08	
Shapiro-Wilk	0.95		0.76		0.49	

4. Patwin has higher yield than Express at Davis and the Delta locations

At the UC Davis Agronomy Farm Patwin showed significantly higher yields than Express during 2004 (24% increase, $P=0.01$), 2005 (41% increase, $P=0.04$) and 2006

(32% increase, $P=0.003$). Yields from Patwin were also higher than Express in the Delta. At this location the differences were not significant in 2003 (79% increase, $P=0.06$), but were significantly higher in 2005 (28% higher, $P=0.003$), and 2006 (99% higher, $P=0.007$). Data are summarized in Table 2.

Table 2. Express and Patwin grain yields (**kg/ha**) at Davis and Delta locations (2004, 2005, and 2006). Data was analyzed by ANOVA as a Randomized Complete Block Design with four replications. The raw data is in Exhibit D Table 2.

Location:	Davis		Davis		Davis	
Day planted:	11/12/2003		11/19/2004		11/16/05	
Day harvested	6/4/2004		6/21/2005		7/17/2006	
Variety	Express	Patwin	Express	Patwin	Express	Patwin
Mean	5511	6813	4331	6125	4661	6170
SE of the mean	47.9	188.1	261.9	374.9	145.1	202.4
P ANOVA	0.01		0.04		0.003	
F ANOVA	33.0		11.9		72.4	
Levene	0.14		0.38		0.49	
Shapiro-Wilk	0.55		0.95		0.71	

Location:	Delta		Delta		Delta	
Day planted:	11/17/2003		11/23/2004		12/5/05	
Day harvested	6/23/2004		6/29/2005		6/29/2006	
Variety	Express	Patwin	Express	Patwin	Express	Patwin
Mean	2078	3715	4576	5862	3123	6222
SE of the mean	493.3	140.5	214.4	314.0	446.3	286.8
P ANOVA	0.06		0.03		0.007	
F ANOVA	8.5		15.7		44.8	
Levene	0.17		0.36		0.39	
Shapiro-Wilk	0.55		0.96		0.99	

The grain yield from Express was lower than the grain yield of Patwin in both Davis and the Delta locations for the three years analyzed here. The differences were statistically significant in five out of the six locations analyzed confirming that Patwin has a better yield potential than Express in these two regions.

No significant differences were detected by Levene's tests ($P>0.05$) indicating valid levels of homogeneity of variances. Normality of the residuals was not rejected for any of the analysis by the Shapiro-Wilk test ($P>0.05$). These results indicate that the results from the ANOVA are valid.

In summary, Patwin presents significant grain yield increases in Davis and the Delta and better stripe rust resistance than Express. Patwin is a Hard White Spring variety whereas Express is a Hard Red Spring variety. Patwin carries the stripe rust resistance gene *Yr17* and Express does not.

Breadmaking quality of Patwin

We compared the breadmaking quality of Patwin with that of the two other HWS varieties currently grown in California. This was not to test distinctiveness, but just to demonstrate its excellent milling and baking characteristics relative to other varieties from the same market class grown in California.

Patwin has high grain protein content (13.5 ± 0.3 % protein), which is similar to Blanca Grande (13.3 ± 0.4 %, $P > 0.05$) but significantly higher than Clear White (12.9 ± 0.2 %, $P < 0.05$, see Appendix D, Table 3).

Patwin has significantly harder grain texture (78.3 ± 2.3) than Clear White (67.6 ± 2.6) or Blanca Grande (62.0 ± 1.9) ($P < 0.05$, see Appendix D, Table 4).

Patwin has similar Thousand Kernel Weight (38.7 ± 1.5 g) to Clear White (37.0 ± 1.0 g) but significantly smaller than Blanca Grande (46.9 ± 1.0 g, $P < 0.05$, see Appendix D, Table 5).

Patwin has high Loaf Volumes (910 ± 11 cc), which are not significantly different from Blanca Grande (941 ± 14 cc, $P > 0.05$) but that are significantly larger than those observed for Clear White (855 ± 16 cc, $P < 0.05$, see Appendix D, Table 6). All three varieties have similar flour extraction rates (Appendix D, Table 7).

In summary, Patwin maintains the high quality breadmaking standards established by Blanca Grande.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 2.5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MD 20705

Exhibit C

OBJECTIVE DESCRIPTION OF VARIETY
Wheat (*Triticum* spp.)

NAME OF APPLICANT (S) University of California	TEMPORARY OR EXPERIMENTAL DESIGNATION UC1419	VARIETY NAME Patwin
ADDRESS (Street and No., or RD No., City, State, Zip Code and Country) 1111 Franklin Street, 12th Floor Oakland, California 94607-5200		FOR OFFICIAL USE ONLY PVPO NUMBER 200600297

PLEASE READ ALL INSTRUCTIONS CAREFULLY:

Place the appropriate number that describes the varietal character of this variety in the boxes below. Place a zero in the first box (e.g. or) when number is either 99 or less or 9 or less respectively. Data for quantitative plant characters should be based on a minimum of 100 plants. Comparative data should be determined from varieties entered in the same trial. Royal Horticultural Society or any recognized color standard may be used to determine plant colors; designate system used: _____ Please answer all questions for your variety; lack of response may delay progress of your application.

1. KIND:

- 1 = Common
2 = Durum
3 = Club
4 = Other (Specify) _____

2. VERNALIZATION:

- 1 = Spring
2 = Winter
3 = Other (Specify) _____

3. COLEOPTILE ANTHOCYANIN:

- 1 = Absent
2 = Present

4. JUVENILE PLANT GROWTH:

- 1 = Prostrate
2 = Semi-Erect
3 = Erect

5. PLANT COLOR: (boot stage)

- 1 = Yellow-Green
2 = Green
3 = Blue-Green

6. FLAG LEAF: (boot stage)

- 1 = Erect
2 = Recurved
1 = Not Twisted
2 = Twisted
1 = Wax Absent
2 = Wax Present

7. EAR EMERGENCE:

Number of Days (Average) after March 1st

Number of Days Earlier Than

Same As

Number of Days Later Than

Blanca Grande

*Relative to a PVPO-Approved Commercial Variety Grown in the Same Trial

8. ANTHR COLOR:

- 1 = Yellow
2 = Purple

9. PLANT HEIGHT: (from soil to top of head, excluding awns)

200600297

093

cm (Average)

11

cm Taller Than

Same As

02

cm Shorter Than

Blanca Grande (but not significant)

10. STEM:

A. ANTHOCYANIN

1

1 = Absent 2 = Present

B. WAXY BLOOM

2

1 = Absent 2 = Present

C. HAIRINESS (last internode of rachis)

1

1 = Absent 2 = Present

D. INTERNODE

1

1 = Hollow

2 = Semi-Solid

3 = Solid

4

Number of Nodes

E. PEDUNCLE

1

1 = Erect

2 = Recurved

3 = Semi-Erect

(slight indentation
in leaf sp. 20)

10

cm Length

F. AURICLE

1

Anthocyanin:

1 = Absent

2 = Present

1

Hair:

1 = Absent

2 = Present

11. HEAD: (At Maturity)

A. DENSITY

2

1 = Lax

2 = Middense (Laxidense)

3 = Dense

B. SHAPE

2

1 = Tapering

2 = Strap

3 = Clavate

4 = Other (Specify)

C. CURVATURE

2

1 = Erect

2 = Inclined

3 = Recurved

D. AWNEDNESS

4

1 = Awnless

2 = Apically Awnletted

3 = Awnletted

4 = Awned

12. GLUMES: (At Maturity)

A. COLOR

1

1 = White

2 = Tan

3 = Other (Specify)

B. SHOULDER

4

1 = Wanting

2 = Oblique

3 = Rounded

4 = Square

5 = Elevated

6 = Apiculate

7 = Other (Specify)

C. SHOULDER WIDTH

2

1 = Narrow

2 = Medium

3 = Wide

D. BEAK

3

1 = Obtuse

2 = Acute

3 = Acuminate

E. BEAK WIDTH

1

1 = Narrow

2 = Medium

3 = Wide

F. GLUME LENGTH

3

1 = Short (ca. 7 mm)

2 = Medium (ca. 8 mm)

3 = Long (ca. 9 mm)

G. WIDTH

2

1 = Narrow (ca. 3 mm)

2 = Medium (ca. 3.5 mm)

3 = Wide (ca. 4 mm)

H. PUBESCENCE

1

1 = Not Present

2 = Present

13. SEED:

A. SHAPE

- ☒ 1 = Ovate
☐ 2 = Oval
☐ 3 = Elliptical

B. CHEEK

- ☒ 1 = Rounded
☐ 2 = Angular

C. BRUSH

- ☒ 1 = Short
☐ 2 = Medium
☐ 3 = Long
- ☒ 1 = Not Collared
☐ 2 = Collared

D. CREASE

- ☒ 1 = Width 60% or less of Kernel
☐ 2 = Width 80% or less of Kernel
☐ 3 = Width Nearly as Wide as Kernel
- ☒ 1 = Depth 20% or less of Kernel
☐ 2 = Depth 35% or less of Kernel
☐ 3 = Depth 50% or less of Kernel

E. COLOR

- ☒ 1 = White
☐ 2 = Amber
☐ 3 = Red
☐ 4 = Other (Specify) _____

F. TEXTURE

- ☒ 1 = Hard
☐ 2 = Soft
☐ 3 = Other (Specify) _____

G. PHENOL REACTION (See Instructions)

- ☒ 1 = Ivory
☐ 2 = Fawn
☐ 3 = Light Brown
☐ 4 = Dark Brown
☐ 5 = Black

H. SEED WEIGHT

- ☒ 38 g/1000 Seed (whole number only)

I. GERM SIZE

- ☒ 1 = Small
☐ 2 = Midsized
☐ 3 = Large

14. DISEASE: PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

(0 = Not Tested 1 = Susceptible 2 = Resistant 3 = Intermediate 4 = Tolerant)

- | | |
|--|---|
| <input checked="" type="checkbox"/> 0 Stem Rust (<i>Puccinia graminis</i> f. sp. <i>tritici</i>) | <input checked="" type="checkbox"/> 2 Leaf Rust (<i>Puccinia recondita</i> f. sp. <i>tritici</i>) <i>Field strains.</i> |
| <input checked="" type="checkbox"/> 2 Stripe Rust (<i>Puccinia striiformis</i>) <i>Field strains</i> | <input checked="" type="checkbox"/> 0 Loose Smut (<i>Ustilago tritici</i>) |
| <input checked="" type="checkbox"/> 0 Tan Spot (<i>Pyrenophora tritici-repentis</i>) | <input checked="" type="checkbox"/> 0 Flag Smut (<i>Urocystis agropyri</i>) |
| <input checked="" type="checkbox"/> 0 Halo Spot (<i>Selenophoma donacis</i>) | <input checked="" type="checkbox"/> 0 Common Bunt (<i>Tilletia tritici</i> or <i>T. laevis</i>) |
| <input checked="" type="checkbox"/> 0 Septoria nodorum (Glume Blotch) | <input checked="" type="checkbox"/> 0 Dwarf Bunt (<i>Tilletia controversa</i>) |
| <input checked="" type="checkbox"/> 0 Septoria avenae (Speckled Leaf Disease) | <input checked="" type="checkbox"/> 0 Karnal Bunt (<i>Tilletia indica</i>) |
| <input checked="" type="checkbox"/> 3 Septoria tritici (Speckled Leaf Blotch) <i>Field strains</i> | <input checked="" type="checkbox"/> 0 Powdery Mildew (<i>Erysiphe graminis</i> f. sp. <i>tritici</i>) |
| <input checked="" type="checkbox"/> 0 Scab (<i>Fusarium</i> spp.) | <input checked="" type="checkbox"/> 0 "Snow Molds" |
| <input checked="" type="checkbox"/> 0 "Black Point" (Kernel Smudge) | <input checked="" type="checkbox"/> 0 Common Root Rot (<i>Fusarium</i> , <i>Cochliobolus</i> and <i>Bipolaris</i> spp.) |
| <input checked="" type="checkbox"/> 0 Barley Yellow Dwarf Virus (BYDV) | <input checked="" type="checkbox"/> 0 Rhizoctonia Root Rot (<i>Rhizoctonia solani</i>) |
| <input checked="" type="checkbox"/> 0 Soilborne Mosaic Virus (SBMV) | <input checked="" type="checkbox"/> 0 Black Chaff (<i>Xanthomonas campestris</i> pv. <i>translucens</i>) |
| <input checked="" type="checkbox"/> 0 Wheat Yellow (Spindle Streak) Mosaic Virus | <input checked="" type="checkbox"/> 0 Bacterial Leaf Blight (<i>Pseudomonas syringae</i> pv. <i>syringae</i>) |
| <input checked="" type="checkbox"/> 0 Wheat Streak Mosaic Virus (WSMV) | <input type="checkbox"/> Other (Specify) _____ |
| <input type="checkbox"/> Other (Specify) _____ | <input type="checkbox"/> Other (Specify) _____ |
| <input type="checkbox"/> Other (Specify) _____ | <input type="checkbox"/> Other (Specify) _____ |
| <input type="checkbox"/> Other (Specify) _____ | <input type="checkbox"/> Other (Specify) _____ |

15. INSECT: (0 = Not Tested 1 = Susceptible 2 = Resistant 3 = Intermediate 4 = Tolerant)

PLEASE SPECIFY BIOTYPE (where needed)

- | | |
|---|--|
| <input checked="" type="checkbox"/> 0 Hessian Fly (<i>Mayetiola destructor</i>) | <input type="checkbox"/> Other (Specify) _____ |
| <input checked="" type="checkbox"/> 0 Stem Sawfly (<i>Cephus</i> spp.) | <input type="checkbox"/> Other (Specify) _____ |
| <input checked="" type="checkbox"/> 0 Cereal Leaf Beetle (<i>Oulema melanopa</i>) | <input type="checkbox"/> Other (Specify) _____ |

15. INSECT: (continued) (0 = Not Tested 1 = Susceptible 2 = Resistant 3 = Intermediate 4 = Tolerant)

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PLEASE SPECIFY BIOTYPE (Where Needed)

<input checked="" type="checkbox"/> Russian Aphid (<i>Diuraphis noxia</i>)	<input type="checkbox"/> Other (Specify) _____
<input checked="" type="checkbox"/> Greenbug (<i>Schizaphis graminum</i>)	<input type="checkbox"/> Other (Specify) _____
<input checked="" type="checkbox"/> Aphids	<input type="checkbox"/> Other (Specify) _____

16. ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS:

Exhibit D. Additional description and statistical analyses

Patwin was compared with Express, which is the most similar variety. The data from Tables 1 and 2 were obtained from the Regional Performance Tests (2004, 2005 and 2006) performed by the UCD breeding program and by Dr. L. Jackson. Regional trials results are published in the 2004, 2005, and 2006 "Regional barley, common and durum wheat, triticale, and oat performance tests" in California, Agronomy Progress Reports #288, #290, and #293 respectively (<http://agric.ucdavis.edu/crops/cereals/cereal.htm>).

Data were analyzed with ANOVA (SAS 9.1) using randomized complete block designs (RCBD) with four replications. Homogeneity of variances was confirmed using Levene's tests. Normality of the residuals was confirmed with the Shapiro-Wilk test. Probability values for the Levene and Shapiro's tests are presented as part of the ANOVA analyses in Exhibit B. Blocks were 1.5 m wide and 6 m long, and seed density was 1.2 million seeds per acre.

The locations tested include:

Davis: UC Davis Agronomy Farm, Yolo Co., CA. Soil type Yolo loam. These location was tested in 2004 (planted 11/12/2003, harvested 6/4/04), 2005 (planted 11/19/2004, harvested 6/21/05), and 2006 (planted 11/16/2005, harvested 7/17/06).

Delta: Victoria Island Farms, Sacramento-San Joaquin Delta (Stockton), San Joaquin Co, CA. Soil type Egbert muck. These location was tested in 2004 (planted 11/17/2003, harvested 6/23/04), 2005 (planted 11/23/2004, harvested 6/29/05), and 2006 (planted 12/5/2005, harvested 6/29/06).

Colusa: Erdman Farms, Grimes, Colusa Co, CA. Soil type Egbert muck. This location was analyzed only in 2006 (planted 11/14/2005, not harvested).

Madera: Dupont Research Facility, Madera, Madera Co, CA. Soil type Visalia Sandy loam. This location was analyzed only in 2006 (planted 11/28/2005, harvested 6/28/06).

Kern: J.G. Boswell, Kern, Kern Co, CA. Soil type Millox clay. This location was analyzed only in 2006 (planted 12/9/2005, harvested 6/19/06).

Tulelake: UC Intermountain REC, Modoc Co, CA. This location was analyzed only in 2006 (planted 5/4/2006, harvested 9/19/06) for comparison of seed color between Patwin and Express.

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Table 1. Stripe rust. Percent final infection of the penultimate leaf (flag-1 leaf) measured at the soft-to medium dough stage of growth. Data was analyzed by ANOVA as a Randomized Complete Block Design with four replications.

Block	Davis 4/22/2004		Davis 5/10/2005		Davis 5/24/2006	
	Express	Patwin	Express	Patwin	Express	Patwin
1	40	0	30	0	96	0
2	60	4	40	1	100	5
3	50	2	3	3	99	10
4	20	14	40	0	97	0
Mean	42.5	5.0	28.3	1.0	98.0	3.8
SE	8.5	3.1	8.7	0.7	0.9	2.4

Block	Delta 4/23/2004		Delta 4/18/2005		Delta 5/26/2006	
	Express	Patwin	Express	Patwin	Express	Patwin
1	30	0	10	0	50	0
2	60	0	3	0	40	3
3	60	3	10	2	30	3
4	50	0	40	3	3	0
Mean	50.0	0.8	15.8	1.3	30.8	1.5
SE	7.1	0.8	8.3	0.8	10.1	0.9

Block	Colusa 5/2/2006		Madera 4/27/2006		Kern 5/17/2006	
	Express	Patwin	Express	Patwin	Express	Patwin
1	100	0	50	0	90	0
2	100	0	20	0	50	1
3	70	0	30	3	70	4
4	95	1	40	3	30	10
Mean	91.3	0.3	35.0	1.5	60.0	3.8
SE	7.2	0.3	6.5	0.9	12.9	2.3

Table 2. Yield data (kg/ha)

Block	Davis 2004		Davis 2005		Davis 2006	
	Express	Patwin	Express	Patwin	Express	Patwin
1	5593	6871	4843	5948	4694	6208
2	5497	6721	3655	6885	4459	5587
3	5572	6376	4626	6508	5059	6472
4	5381	7284	4200	5160	4432	6413
Mean	5510.8	6813.0	4331.0	6125.3	4661.0	6170.0
SE	47.9	188.1	261.9	374.9	145.1	202.4

Block	Delta 2004		Delta 2005		Delta 2006	
	Express	Patwin	Express	Patwin	Express	Patwin
1	2030	3374	4664	5042	3206	6360
2	1156	4062	3998	5703	3959	5753
3	1670	3721	5033	6295	1869	5800
4	3457	3703	4610	6408	3457	6977
Mean	2078.3	3715.0	4576.3	5862.0	3122.8	6222.5
SE	493.3	140.5	214.4	314.0	446.3	286.8

Milling and baking characteristics of Patwin compared to other HWS varieties grown in CA

Data were analyzed with ANOVA (SAS 9.1) using randomized complete block designs (RCBD). Since we only have one baking test per year/location, the Year/Location combinations were used as blocks and the Year/Location * Variety interaction was used as an estimate of the error term. Homogeneity of variances was confirmed using Levene's tests. The California Wheat Commission Quality Laboratory, Woodland, CA, provided all the breadmaking quality analyses.

Table 3. Grain Protein Content (%) at 12% humidity (14 year-location).

Year/location	UC1419
Butte-04-reg.	11.8
Colusa-04-reg.	12.7
Davs-04-reg.	13.7
Delta-04-reg.	14.6
Madera-04-reg.	14.4
Kings-04-reg.	13.7
Kern-04-reg.	14.0
Butte-05-reg.	14.3
Colusa-05-reg.	12.7
Davis-05-reg.	13.7
Delta-05-reg.	13.7
Fresno-05-reg.	11.2
Kings-05-reg.	14.4
Kern-05-reg.	14.2
Mean	13.5
SE	0.3

RCBD (using environments as blocks) $P = 0.0146$

Homogeneity of variances (Levene's test) = 0.14

Mean comparison using Tukey test:

Patwin has a high –grain protein content not significantly different from Blanca Grande (standard of excellent quality and high protein) but is significantly higher than Clear White ($P < 0.05$).

Table 4. Hardness (grain texture measured by NIR)

Year/location	Blanca Grande	Clear White	Patwin
Davis-03-elite	69	72	80
Colusa-03-elite	64	69	75
Davis-04-elite	62	72	79
Colusa-04-elite	68	72	82
Kings-04-elite	60	71	84
Kings-04-reg.	61	71	83
Davis-05-elite	50	54	67
Colusa-05-elite	54	50	64
Kings-05-elite	66	74	85
Kings-05-reg.	66	71	84
Mean	62.0	67.6	78.3
SE	1.9	2.6	2.3

RCBD (using environments as blocks) $P < 0.0001$

Homogeneity of variances (Levene's test) = 0.68

Mean comparison using Tukey test:

Patwin grains are significantly harder ($P < 0.05$) than Clear White or Blanca Grande, which are also significantly different between each other.

Table 5. Thousand Kernel Weight (g)

Year/location	Blanca Grande	Clear White	Patwin
Davis-03-elite	44.9	40.5	42
Colusa-03-elite	48.7	30.2	44.7
Davis-04-elite	49.4	37.8	39.7
Colusa-04-elite	50.2	37.6	38.5
Kings-04-elite	48.8	37.5	32.1
Kings-04-reg.	49.3	38.3	38.8
Davis-05-elite	43.1	34.5	41.5
Colusa-05-elite	49.6	41.5	43.9
Kings-05-elite	43.9	34.3	31.6
Kings-05-reg.	41.1	38.0	34.6
Mean	46.9	37.0	38.7
SE	1.0	1.0	1.5

RCBD (using environments as blocks) $P < 0.0001$

Homogeneity of variances (Levene's test) = 0.26

Mean comparison using Tukey test:

Patwin 1000-kernel weight is not significantly different from Clear White but is significantly smaller than Blanca Grande ($P < 0.05$).

Table 6. Loaf volume (cc)

Year/location	Blanca Grande	Clear White	Patwin
Davis-03-elite	925	815	925
Colusa-03-elite	890	750	895
Davis-04-elite	955	915	965
Colusa-04-elite	1000	845	900
Kings-04-elite	995	885	950
Kings-04-reg.	940	880	850
Davis-05-elite	980	895	900
Colusa-05-elite	895	800	870
Kings-05-elite	950	885	920
Kings-05-reg.	880	880	925
Mean	941	855	910
SE	13.7	16.3	11.0

RCBD (using environments as blocks) $P < 0.0001$

Homogeneity of variances (Levene's test) = 0.41

Mean comparison using Tukey test:

Patwin average loaf volume is not significantly different from Blanca Grande but is significantly larger than Clear White ($P < 0.05$).

Table 7. Flour yield (%) at 14% moisture basis

Year/location	Blanca Grande	Clear White	Patwin
Davis-03-elite	67.8	68.7	66.9
Colusa-03-elite	67.9	65.4	67.1
Davis-04-elite	70.4	74.0	69.3
Colusa-04-elite	70.5	72.9	67.5
Kings-04-elite	71.6	71.9	65.6
Kings-04-reg.	67.2	69.8	69.3
Davis-05-elite	65.6	65.1	68.7
Colusa-05-elite	65.4	70.3	68.9
Kings-05-elite	64.5	63.2	62.9
Kings-05-reg.	66.6	64.9	61.9
Mean	67.8	68.62	66.81
SE	0.8	1.2	0.8

RCBD (using environments as blocks) $P = 0.18$

Homogeneity of variances (Levene's test) = 0.09

Mean comparison using Tukey test:

There are no significant differences in flour yield among these three varieties ($P > 0.05$).

E. Area of adaptation and primary use

Patwin performs well agronomically in all areas where it has been evaluated in California and has good quality characteristics for bread making. Patwin appears to be well suited for the San Joaquin and Sacramento Valley where it shows high yield potential under irrigation. Patwin combines a high yield potential with excellent bread making quality and resistance to the major pathogens found in California. Its primary use is for bread production.

F. Procedure for maintaining stock seed classes

The Department of Plant Sciences, UCD will maintain Breeders seed. Foundation seed will be produced and distributed by the Foundation Seed program of the University of California, Davis. The California Crop Improvement Association will provide certification services. New Breeders seed will be produced as needed from head-row progenies obtained from the original Breeders Seed lot.

Foundation seed will not be limited to the number of generations. Foundation seed will be maintained solely by the University of California Foundation Seed Program. Registered seed will only be produced from Foundation seed. Certified Seed will be produced from Registered Seed (or Foundation Seed). Certified Seed can also be produced from Certified Seed only for one cycle. After that, Certified Seed needs to be produced from new Registered or Foundation Seed to maintain seed purity.

Characteristics to assist field inspectors



Figure 1. Wax in Patwin

The most characteristic features of Patwin are white seeds and its improved resistance to stripe rust relative to Express. Wax is abundant on the surfaces of leaves, glumes, stems and peduncles in mature Patwin plants as in the parental line Express (Figure 1). Wax is not present or is not as abundant in other Hard White Spring varieties grown in CA.

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). The information is held confidential until the certificate is issued (7 U.S.C. 2426).

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

1. NAME OF APPLICANT(S) The Regents of the University of California	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER UC1419	3. VARIETY NAME Patwin
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country) University of California 1111 Franklin Street, 12th Floor Oakland, California 94607-5200	5. TELEPHONE (Include area code) (510) 587-6000	6. FAX (Include area code) (510) 587-6090
7. PVPO NUMBER		200600297

8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. If no, please explain.



YES



NO

9. Is the applicant (individual or company) a U.S. national or a U.S. based company? If no, give name of country.



YES



NO

10. Is the applicant the original owner?



YES



NO

If no, please answer one of the following:

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?



YES



NO

If no, give name of country

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?



YES



NO

If no, give name of country

11. Additional explanation on ownership (Trace ownership from original breeder to current owner. Use the reverse for extra space if needed):

Breeders are employees of applicant/owner.

PLEASE NOTE:

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.
3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 0.1 hour per response, including the time for reviewing the instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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